

301 ~ Start

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302 ~

Providing a semiconductor wafer with a plurality of device units. The units have an active surface protected by an overcoat, in which windows are exposing the metal contact pads. A patterned barrier layer is on the pad metal in the windows; on the barrier is one metal stud (preferably copper or nickel), which has an outer surface (preferably palladium) suitable to form metallurgical bonds without melting.

303 ~

Providing a lead frame for the whole wafer, having a plurality of segment groups (preferably nickel-plated copper), each group suitable for one device unit. Each segment has first and second ends covered by a solderable metal (preferably palladium).

304 ~

Placing solder paste (preferably tin or tin alloy with flux) on each first segment end.

305 ~

Aligning lead frame with wafer so that each paste-covered segment end is aligned with the corresponding metal stud of the respective device unit.

306 ~

Connecting the lead frame to the wafer by contacting the metal studs and the first segment ends and reflowing the solder paste.

307 ~

Encapsulating the wafer, ^{preferably} in a molding compound, so that the device units and first segment ends are covered, while the second segment ends remain exposed.

308 ~

Separating the encapsulated wafer into individual encapsulated device units.

309 ~ Stop

FIG. 3

401 ~ Start

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402 ~ Providing a semiconductor chip having an active surface protected by an overcoat, in which windows are exposing the metal contact pads. A patterned barrier metal layer is on the pad metal in the windows; on the barrier is one metal stud (preferably copper or nickel) which has an outer surface (preferably palladium) suitable to form metallurgical bonds without melting

403 ~ Providing a lead frame having a plurality of segments (preferably nickel-plated copper); each segment has first and second ends covered by a solderable metal (preferably palladium)

404 ~ Placing solder paste (preferably tin or tin alloy with flux) on each first segment end

405 ~ Aligning lead frame with chip so that each paste-covered segment end is aligned with the corresponding chip metal stud

406 ~ Connecting the lead frame to the chip by contacting the metal studs and the first segment ends and reflowing the solder paste

407 ~ Encapsulating the chip and the first segment ends (preferably in a molding compound), while leaving the second segment ends exposed

408 ~ Stop

FIG. 4

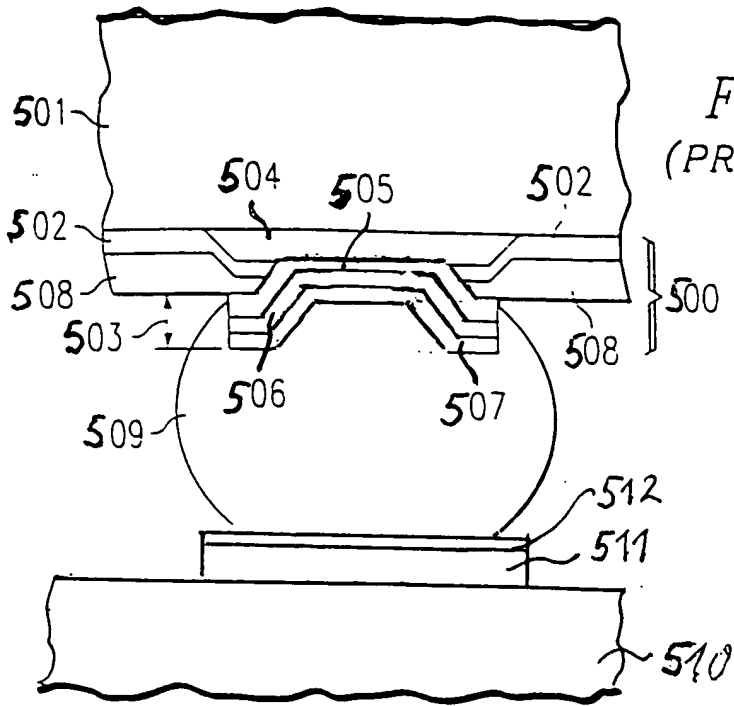


FIG. 5A
(PRIOR ART)

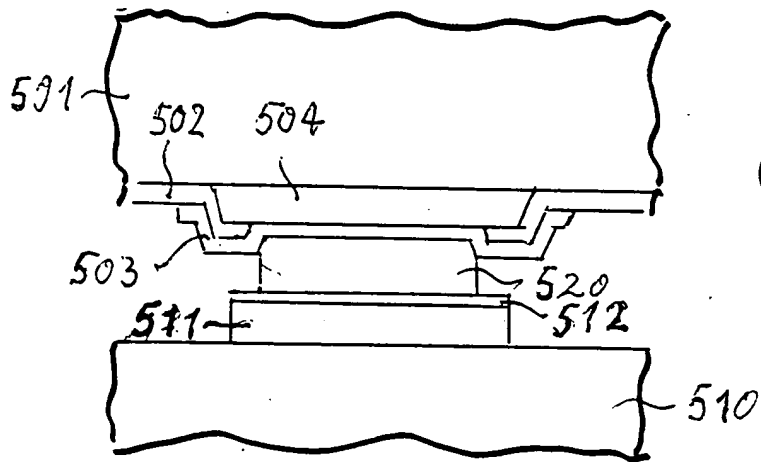


FIG. 5B
(PRIOR ART)

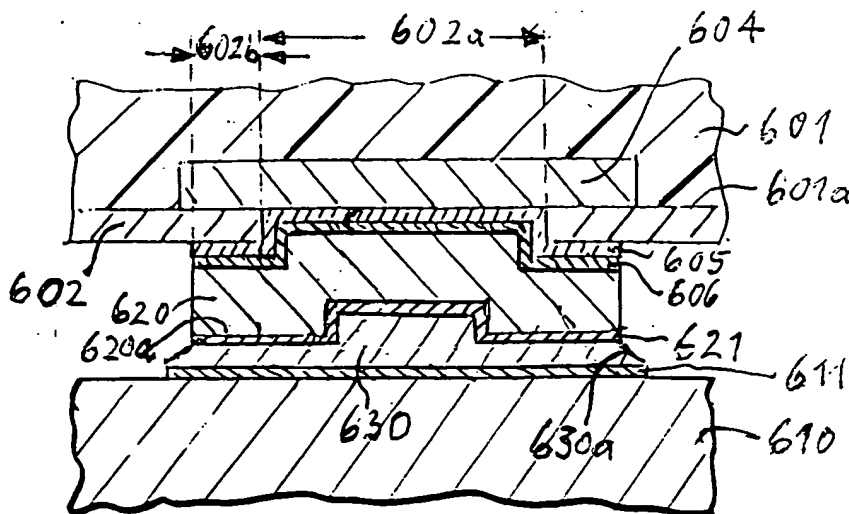


FIG. 6

FIG. 7

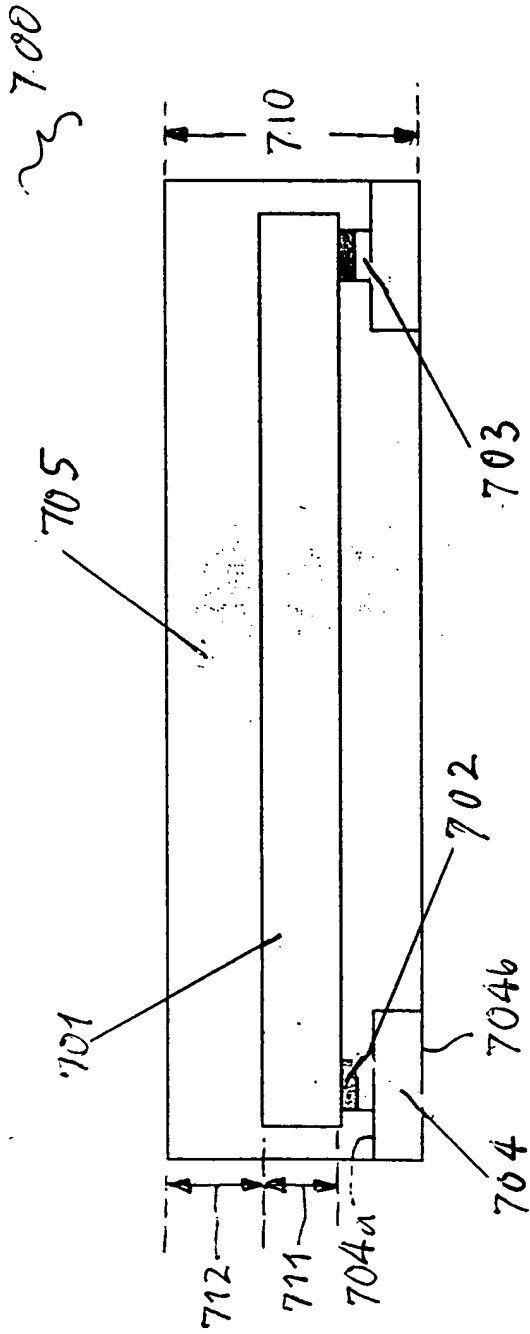


FIG. 8

